

**EXPLANATION OF SIGNIFICANT DIFFERENCES  
TO THE HARBOR ISLAND –  
SHIPYARD SEDIMENT OPERABLE UNIT  
TODD SHIPYARD SEDIMENTS  
SEATTLE, WASHINGTON**

**SELECTED REMEDIAL ACTION**

**I. Introduction**

**A. Purpose**

The purposes of this Explanation of Significant Differences (ESD) are: (1) to further define the selected remedial action for the under-pier areas; (2) to establish confirmational numbers characteristic of contamination present in the West Waterway for the purpose of defining the Todd Shipyard Sediments Operable Unit (TSSOU) boundary; (3) to adjust the TSSOU boundary based on the use of confirmational numbers; (4) to summarize the long-term monitoring, maintenance and operational requirements for TSSOU, (5) to define “predominately abrasive grit blast (AGB), and (6) to identify the disposal option.

**B. Site Name and Location**

The TSSOU consists of contaminated nearshore sediments within and adjacent to the Todd Shipyard on Harbor Island (Figure 1). Harbor Island is located approximately one mile southwest of downtown Seattle, in King County, Washington, and lies at the mouth of the Duwamish River on the southern edge of Elliott Bay (Figure 2). The island is manmade, approximately 430 acres in size, and used for industrial purposes. Todd Shipyard is located at the northwest corner of Harbor Island and faces Elliott Bay to the north and the West Waterway of the Duwamish River to the west.

**C. Lead and Support Agencies**

U.S. Environmental Protection Agency (EPA) – Lead Agency for sediment remediation.

State of Washington, Department of Ecology – Support Agency for sediment remediation.

#### **D. Statutory Authorities for the Explanation of Significant Differences (ESD)**

Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9617(c), and Section 300.435(c)(2) of the National Oil and Hazardous Substances Contingency Plan (NCP), authorize changes to the selected remedial action after issuance of a ROD. This ESD documents refinements to the selected remedial action for the Todd Shipyard Sediment Operable Unit.

#### **E. Administrative Record**

This ESD, a previous ESD issued in December, 1999, the Record of Decision, the Conceptual Design Report, Preliminary Design Report, various technical memoranda presenting geotechnical characterizations and a marine structures survey, as well as sediment chemical and biological testing results, and other reports and information related to the TSSOU are part of the administrative record. The administrative record is available for public review at the following location:

Environmental Protection Agency  
1200 Sixth Avenue, 7<sup>th</sup> floor  
Seattle, Washington  
(206) 553-4494

## **II. Summary of Site History, Nature and Extent of Contamination and Selected Remedy**

Harbor Island and the surrounding estuarine environment are highly industrialized. Prior to 1905, the area consisted of tideflats with a few piling-supported structures (mainly railroad trestles). The island was created between 1903 and 1905 with dredged material from the construction of the East and West Waterways and the main navigational channel of the Duwamish River. Since construction, the island has been used for commercial and industrial activities.

Todd Shipyards initiated shipbuilding activities on the island in 1916. Todd Shipyards is currently a ship repair, construction, and conversion facility that services approximately 275 vessels a year, including Navy vessels, Coast Guard vessels, passenger ferries, barges, fishing vessels, cruise ships, tank vessels and tug boats. The shipyard operates three drydocks at Piers 4, 5, and 6 for vessel repair and maintenance. A west sloping building berth is located on the West Waterway of the Duwamish River at Piers 1A and 1 for construction and launching of new vessels. Moorage berths are located along Piers 1, 2, 3, 4, 5, and 6. The existing facilities at Todd Shipyards include bulkheads, riprap protection of buttress fill slopes, pile-supported piers, floating

drydocks, a pile-supported building berth, a pile supported side launching way, and miscellaneous access ramps.

Harbor Island was listed by EPA as a Superfund site in 1983. EPA issued the ROD in November 1996, for the remediation of contaminated sediments adjacent to both the Todd and the former Lockheed Shipyards. EPA determined that cleanup actions were necessary because of unacceptable risks to benthic organisms and to subsistence fishers.

The ROD states: (1) all sediment exceeding the chemical contaminant screening level (CSL) of the State of Washington Sediment Management Standards (SMS) and shipyard waste be dredged and disposed of in an appropriate in-water or upland disposal facility, (2) all sediments exceeding the sediment quality standards (SQS) of the SMS be capped with a minimum of 2 feet of clean sediment, (3) specification of design criteria for acceptable habitat and to prevent future recontamination; and (4) institution of long-term monitoring and maintenance of the remedy. Additionally, the ROD notes that “(t)he extent of dredging of contaminated sediments and waste under piers at .... Todd Shipyard will be determined during remedial design based on cost, benefit and technical feasibility.”

The TSSOU was established because TSSOU “sediments are distinct from other contaminated sediments at Harbor Island ... they are predominately contaminated with hazardous substances and shipyard wastes (primarily sandblast grit) released by shipbuilding and maintenance operations at Todd (and Lockheed) Shipyards” (see ROD, Section E. Scope and Role of Response Action Within the Remedial Strategy). Hazardous substances released from these shipyards include arsenic, copper, lead, mercury, tributyltin (TBT), and zinc, which were additives to marine paints used on ships. Other hazardous substances potentially associated with shipyard activities include polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs).

### **III. Description of and Basis for the Significant Differences**

#### **A. Introduction**

Subsequent to the ROD, pre-remedial design studies for the Todd Shipyard Sediment Operable Unit have better defined the nature and extent of contamination. This sediment characterization has been further used by EPA to determine the most technically feasible, cost-effective approach for implementing the dredge and cap remedy. During this pre-remedial design phase EPA has also developed definitions for “shipyard waste,” including definitions for AGB and shipyard debris.

This ESD documents the following for the Todd Shipyard Sediment Operable Unit:

- (1) defines the selected remedial action for the under-pier areas;
- (2) establishes confirmational numbers characteristic of contamination present in the West Waterway for the purpose of defining the TSSOU boundary;
- (3) adjusts the TSSOU boundary based on the use of confirmational numbers;
- (4) summarizes the long-term monitoring, maintenance and operational parameters for TSSOU;
- (5) defines “predominately abrasive grit blast” (AGB), and
- (6) identifies the disposal option for contaminated sediments dredged from the TSSOU.

## **B. EPA Proposed Remedial Action for the Under-pier Areas**

The ROD notes that “(t)he extent of dredging of contaminated sediments and waste under piers at .... Todd Shipyard will be determined during remedial design based on cost, benefit and technical feasibility.” In accordance with that ROD requirement that additional information be obtained to further define the under-pier remedy, Todd collected, analyzed and reported information in the Conceptual Design Report, Preliminary Design Report and various data remedial investigation documents and technical memorandums. Refer to the Key Documents at the end of the ESD for a listing of documents used by EPA to define the under-pier remedy.

The remedy for the under-pier areas is as follows:

### **1. Under Piers 2 and 4S**

- Demolish Pier 2 and 4S.
- For Pier 2, pull all piles. If a pile can not be pulled, the pile should be broken or cut off below the future mudline.
- For Pier 4S, pull piles, to the extent possible, without compromising slope stability. If a pile can not be pulled, the pile should be broken or cut off below the future mudline.
- Dredge contaminated sediments to the SQS.

## **2. Under Piers 1, 1A, 2P, 3, 6, 6P and the Building Berth**

- In under-pier areas where remediation is required, apply granular material to an average overall thickness of at least one foot<sup>1</sup>. Areas of under-pier riprap that contain minimal or no visible sediment do not require remediation.
- Placement of granular material will extend beyond the boundary of the piers to include the “no dredge zone”.
- Contaminated sediments in the under- pier areas of Piers 1, 1A, 2P, 3, 6, 6P and the Building Berth will be dredged, after pier demolition, when the existing pier structures reach the end of their serviceable life.

## **3. Under Piers 4N and 5**

- In under-pier areas where remediation is required, apply granular material to an average overall thickness of at least 3 feet. Areas of under-pier riprap that contain minimal or no visible sediment do not require remediation.
- Placement of granular material will extend beyond the boundary of the piers to include the “no dredge zone”.
- Contaminated sediments in the under- pier areas of Piers 4N and 5 will be dredged, after pier demolition, when the existing pier structures reach the end of their serviceable life.

Specifications for the grain size distribution of granular materials to be used for capping purposes will be determined in final design. Goals for material specification will include consistency of placement, protectiveness, stability and habitat benefit.

## **C. Confirmational Numbers**

Confirmational numbers have been defined as those concentrations that EPA has determined to be characteristic of contamination present in the adjacent West Waterway. These confirmational numbers have been used to assist EPA in defining the TSSOU remediation; and could also be used in determining potential future recontamination.

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<sup>1</sup> Note that the one foot of granular material could change to a thickness greater than one foot if further design engineering analysis indicate that a layer of granular material greater than one foot can be placed under Piers 1, 1A, 2P, 3, 6, 6P and the Building Berth without causing pier structural problems.

To enable dredging of the TSSOU, it may be necessary for newly exposed surfaces to be created outside the TSSOU for purposes of meeting existing grades. If such newly exposed surfaces are created outside the TSSOU, Todd may sample the newly exposed surface to determine compliance with the confirmational numbers and undertake additional remedial action as deemed appropriate by EPA, or Todd may place a one-foot layer of sand on the newly exposed surface in lieu of sampling along the newly exposed surfaces.

<b>Confirmational Numbers by Chemical of Concern</b>			
<b>Contaminant</b>	<b>SQS (mg/kg)</b>	<b>CSL (mg/kg)</b>	<b>Confirmational Number</b>
Arsenic	57 dw	93 dw	93 (mg/kg) dw
Copper	390 dw	390 dw	390 (mg/kg) dw
Lead	450 dw	530 dw	530 (mg/kg) dw
Zinc	410 dw	960 dw	960 (mg/kg) dw
LPAHs*	370 toc	780 toc	780 (mg/kg) toc 13 mg/kg dw
HPAHs**	960 toc	5300 toc	5300 (mg/kg) toc 69 mg/kg dw
<b>For Bioaccumulants</b>			
PCBs	12 toc	65 toc	39 (mg/kg) toc 591 ug/kg dw
Tributyltin	not available	not available	76 (mg/kg) toc 1335 ug/kg dw
Mercury	0.41 dw	0.59 dw	1.34 (mg/kg) dw

d.w. = dry weight

toc = total organic carbon normalized

\* low molecular weight polynuclear aromatic hydrocarbons

\*\* high molecular weight polynuclear aromatic hydrocarbons

Given the coarse-grained characteristics of some of the TSSOU sediments, EPA will retain use of the DW TBT confirmational number as well as the total organic carbon (TOC) normalized value. Where the TOC is less than 1 percent, the dry weight criterion will be used; otherwise the TOC-normalized version will apply.

#### **D. Adjustments to the TSSOU**

The TSSOU is adjusted to include two additional areas, as shown on Figure 1. These areas encompass sample point HI-NS-09 to the north, and sample points

TS-P2-22-S and TS-043 to the west. Based on review of available data, EPA has concluded that all contamination associated with the TSSOU is included within the adjusted boundary which includes any newly exposed surfaces created as a result of dredging in the TSSOU. This determination by EPA is not intended to release Todd Pacific Shipyards from whatever liability it may have in the adjacent West Waterway Operable Unit.

#### **E. Long-term Operational, Maintenance, and Monitoring Parameters**

A Long-Term Operational, Maintenance and Monitoring Plan (OMMP) will be submitted with the 95% Remedial Design for the TSSOU. The following will be addressed in detail in the OMMP:

- erosion monitoring by survey, video or other means of the under-pier granular materials, with contingencies for maintenance of the cap materials and potential sampling for chemicals of concern (COCs) in areas adjacent to the piers if erosion of cap materials has occurred;
- monitoring of stormwater source control actions through documentation of compliance with NPDES requirements, and monitoring of potential NPDES system overflows for both NPDES and sediment chemicals of concern (COCs);
- monitoring of dry dock grit management source control actions through documentation of compliance with NPDES requirements.
- EPA may require monitoring of the open water areas to be conducted as part of Five Year Reviews. If chemical monitoring for COCs is performed in open water areas along the outer areas of the TSSOU, results will be compared to the confirmational numbers listed in section C-E above to determine whether recontamination has occurred at levels of concern.

All monitoring activities will be subject to EPA's review, approval, oversight and reporting requirements.

#### **F. Definition for Shipyard Waste, Abrasive Grit Blast and Shipyard Debris.**

The following definitions for shipyard waste, AGB and shipyard debris are proposed below. The definition for AGB consists of a physical and a chemical component which when combined are a "signature" for AGB. Based on activities associated with shipyards, field observations, seabed characterization work (including bathymetry and sidescan sonar) and other site investigation data, EPA proposes that shipyard waste be defined as consisting of 1 or 2:

## **1. Abrasive Grit Blast (AGB)**

Identification of AGB may be made by one of two means: visible evidence, or chemical and physical evidence. Visual identification alone is sufficient to identify AGB (see a. below). The second means (see b. below) of identification is a combination of chemical and physical evidence. The criteria for determining AGB are:

a. Visual identification: EPA and Todd agree that the material is predominantly AGB.

OR

b. Chemical and physical evidence: Data indicating that the grain size of the material is greater than (or equal to) 50 percent coarse material typically associated with spent grit blast (i.e., 0.15 to 2.0 mm in size);

AND AT LEAST TWO OF THE FOLLOWING:

- i. Copper concentration greater than the chemical screening level (CSL) of 390 mg/kg;
- ii. Zinc concentration greater than the CSL of 960 mg/kg;
- iii. Arsenic concentration greater than the CSL of 93 mg/kg.

## **2. Shipyard Debris and Other Shipyard Waste**

Wood, concrete, sheet steel, steel cables, tires, welding rods, and various other debris or shipyard waste that will impede dredging activities or compromise the integrity of the cap.

The above AGB definition is a generic definition developed solely for the TSSOU. All AGB will be removed from the TSSOU as part of the remedy, to the extent practicable.

## **G. Disposal of Dredged Sediments**

The ROD stated that dredged sediments must be disposed in “appropriate confined nearshore disposal (CND) or confined aquatic disposal (CAD) facilities.” The ROD further stated that the appropriate CND or CAD facilities would be selected in remedial design and if a suitable site could not be found, dredged sediments must be taken to an appropriate upland disposal facility. Analysis of disposal options during remedial design, based on the ROD criteria, identified upland disposal facilities as the appropriate disposal option for dredged TSSOU sediments.



#### IV. Support Agency Comments

The Washington Department of Ecology participated in the review of the new information that led to the preparation of this ESD, and concurs with this modification to the remedy for the Todd Shipyard Sediment Operable Unit. Ecology recognizes that EPA will conduct five year reviews for the Harbor Island Site. The primary purpose of a five year review is to determine whether the selected remedy continues to be protective of human health and the environment. The five year reviews will include the Soil and Groundwater Operable Unit, the two Shipyard Operable Units and the West Waterway Operable Unit. Ecology will have an opportunity to participate in the five year review. Among the issues that will be evaluated for the Shipyard Operable Units will be the contaminants remaining above the State Sediment Management Standards.

#### V. Affirmation of Statutory Determinations

Considering the new information that has been developed and the changes that have been made to the selected remedy, EPA believes that the remedy remains protective of human health and the environment, complies with federal and state requirements that were identified in the ROD as applicable or relevant and appropriate to this remedial action, and is cost-effective. The remedy continues to utilize permanent solutions and alternative treatment technologies to the maximum extent possible. This ESD is consistent with the requirements and considerations for remediation established in the ROD.

#### VI. Public Participation Activities

A public notice will be placed in a local newspaper announcing the availability of the ESD to the public. The Administrative Record, located at the information repository listed in section E of this ESD, contains the ESD and supporting documentation. A listing of the Administrative Record documents is attached to this ESD.

  
Michael F. Gearheard  
Director, Office of Environmental Cleanup

3/31/03  
Date

To Be Added:

A listing of the Administrative Record documents